

We claim:

1. A polymer composition for display mediums, comprising:
a co-polymer composite of an alkyl material and a phosphonate material; and
luminescent metal ions dispersed in the composite, wherein the composition can be used
for displays.
2. The composition of claim 1, wherein the alkyl material includes:
alkyl acrylate.
3. The composition of claim 1, wherein the alkyl material includes:
alkyl methacrylate.
4. The composition of claim 1, wherein the phosphate material includes:
dialkyl vinylbenzylphosphonate.
5. The composition of claim 1, wherein the phosphate material includes:
alkyl vinylbenzylphosphonic acid monoester.
- 20 6. The composition of claim 1, wherein the phosphate material includes:
vinylbenzylphosphonic acid .
7. The composition of claim 1, wherein the composite has a molar ratio of:
approximately 20% to approximately 95% acrylate material; and
approximately 80 %to approximately 5% phosphate material.
- 25 8. The composition of claim 1, wherein the luminescent metal ions include:

rare earth compounds.

9. The composition of claim 1, wherein the luminescent metal ions include:

NaYF₄:ErYb

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10. The composition of claim 1, wherein the composite is:

phosphorylated polymethyl methacrylate(p-PPMA).

11. The composition of claim 1, wherein the luminescent metal ions include:

10 rare earth ions co-doped with Yb³⁺ in fluoride and orthophosphate crystalline hosts.

12. The composition of claim 11, wherein the doping ion further includes:

Tm.

- 15 13. The composition of claim 11, wherein the doping ion further includes:

Er.

14. The composition of claim 11, wherein the doping ion further includes:

Ho.

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15. The composition of claim 11, wherein the doping ion further includes:

Nd.

- 25 16. The composition of claim 11, wherein the doping ion further includes:

Pr.

17. The composition of claim 11, wherein the doping ion further includes:

Ce.

18. The composition of claim 11, wherein the crystalline hosts include:

NaYF₄.

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19. The composition of claim 11, wherein the crystalline hosts include:

KYF.

20. The composition of claim 11, wherein the crystalline hosts include:

YLF.

21. The composition of claim 11, wherein the crystalline hosts include:

LuPO₄.

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22. A polymer composition for optical applications, comprising:

a co-polymer composite host of an alkyl material and a phosphonate material; and
luminescent metal ions dispersed in the composite host without cracking and

delamination of the composite host, wherein the composition is used for optical applications.

- 20 23. A method of making a polymer composition, comprising the steps of:

forming a co-polymer from an alkyl material and a phosphonate material; and

dispersing luminescent metal ions in the co-polymer without cracking and delaminating
of the co-polymer.

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